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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/602,059	06/23/2000	Charles M. McKenna	V0077/7117 WRM	9493

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Gary L Loser
Varian Semiconductor Equipment Associates Inc
35 Dory Road
Gloucester, MA 01930

EXAMINER
EL SHAMMAA, MARY A

ART UNIT	PAPER NUMBER
2881	

DATE MAILED: 08/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/602,059	MCKENNA ET AL.	
	Examiner	Art Unit	
	Mary A. El-Shammaa	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 May 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-57* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-57* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 June 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims1, 3-4, 10-11, 15, 17-19, 24, 30, 32-33, 37, 39-40, 45, 48, 49, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (5,751,002) in view of Takahashi et al. (6,242,750).

Regarding claims 1 and 30, Ogata et al. discloses in Figs. 5, 8, and 11-14 an ion implanting apparatus and method comprising an ion source (**1**) for generating an ion beam at a first voltage; an analyzer (**2**) for separating unwanted components from the ion beam; a beam transport device (**11, 12**) for transporting the ion beam through the analyzer at a first transport energy; a beam filter comprising a magnet (**6**); and a target site (**10**) for supporting a target for ion implantation, wherein the ion beam is transported through the beam filter and is delivered to the target site at a final energy (Col. 4, Lines 20-61; Col. 5, Lines 1-9; Col. 6, Line 59 through Col. 7, Line 10; Col. 7, Line 31 through Col. 8, Line 35). Ogata et al. does not disclose a deceleration stage positioned downstream of the analyzer for decelerating the ion beam from the first transport energy to a final energy *lower* than the first transport energy. Takahashi et al. discloses an ion implantation apparatus and method in Fig. 1 comprising an ion source (**2**) for generating an ion beam at a first voltage; an analyzer (**6**) for separating unwanted components

from the ion beam; a beam transport device (7) for transporting the ion beam through the analyzer at a first transport energy; and a deceleration stage (**10, 11, 12**) positioned downstream of the analyzer (**6**) for decelerating the ion beam from the first transport energy to a final energy lower than the first transport energy wherein the ions are implanted into the target (**14**) at the final beam energy (Col. 1, Lines 60-63; Col. 2, Lines 6-21, 44-65; Col. 3, Lines 4-53; Col. 4, Lines 12-17). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the deceleration stage that decelerates the beam from a first transport energy to a final energy lower than the first transport energy as taught by Takahashi et al. because Takahashi et al. teaches that by decelerating the beam before implantation allows for a large current of the low energy beam to be implanted into the target while providing efficient transport of the beam (Col. 3, Lines 12-19 and 49-53).

Regarding claims 3 and 17, Ogata et al. discloses an analyzing magnet (**2**) and a resolving slit (**4**) so that ions are passed through the slit by the magnet (Col. 4, Line 62 through Col. 5, Line 1; Col. 6, Lines 59-65).

Regarding claims 4, 19, 33, 40, and 48, Ogata discloses in Fig. 15 said beam filter comprising an angle corrector magnet (**15**) for directing the ions in the ion beam along substantially parallel trajectories (Col. 8, Lines 48-65).

Regarding claims 10-11, 24-25, 32, and 49, Takahashi et al. discloses the claimed invention except for the deceleration stage explicitly comprising a decelerating electrode and a suppression electrode. It would have been obvious to one having ordinary skill in the art at the time the invention was made to specifically have the electrodes of the deceleration stage of Takahashi et al. include a deceleration electrode and a suppression electrode, since it has been

held that omission of an element and its function in a combination where the remaining elements perform the same function as before involves only routine skill in the art. In re Karlson, 136 USPQ 184.

Regarding claims 15 and 37, Ogata et al. in view of Takahashi et al. discloses the claimed invention except for a second beam transport device and a second deceleration stage. It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a second beam transport device and a second deceleration stage, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. St. Regis Paper Co. v. Bemis Co., 193 USPQ 8.

Regarding claims 18 and 39, Ogata et al. discloses the beam filter comprising a magnet (**6**) that deflects ions in the ion beam (Col. 4, Lines 37-39).

Regarding claim 45, Ogata et al. discloses in Figs. 8 and 9 an ion implanting apparatus and method thereof comprising an ion source (**1**) for generating and accelerating an ion beam at a first voltage, a beamline module (**11**) containing one or more beamline components (**11*e***), a beam transport device (**12**) for transporting the beam through the module at a first transport energy, a beam filter (**6**) downstream of beamline module for separating neutral particles from the ion beam, and a target site (**10**) for mounting a target for implantation (Col. 6, Line 59 through Col. 7, Line 30). Ogata et al. does not disclose a deceleration stage positioned between the beamline module and the beam filter for decelerating the ion beam from the first transport energy to a final energy *lower* than the first transport energy. Takahashi et al. discloses an ion implantation apparatus and method in Fig. 1 comprising an ion source (**2**) for generating an ion beam at a first voltage; an analyzer (**6**) for separating unwanted components from the ion beam; a

beam transport device (7) for transporting the ion beam through the analyzer at a first transport energy; and a deceleration stage (**10, 11, 12**) positioned downstream of the analyzer (**6**) for decelerating the ion beam from the first transport energy to a final energy lower than the first transport energy wherein the ions are implanted into the target (**14**) at the final beam energy (Col. 1, Lines 60-63; Col. 2, Lines 6-21, 44-65; Col. 3, Lines 4-53; Col. 4, Lines 12-17). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the deceleration stage that decelerates the beam from a first transport energy to a final energy lower than the first transport energy as taught by Takahashi et al. because Takahashi et al. teaches that by decelerating the beam before implantation allows for a large current of the low energy beam to be implanted into the target while providing efficient transport of the beam (Col. 3, Lines 12-19 and 49-53).

Regarding claim 52, Ogata discloses, in addition to the features of claim 45, in Fig. 14 a second beamline module (7) downstream of first beamline module (**11**) comprising a beam filter (**6**) (Col. 8, Lines 27-35).

Claims 5, 13, 14, 20, 27-29, 34, 41, 42, 46, 47, 53-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. in view of Takahashi et al. in further view of Ito et al. (5,399,871).

Neither Ogata et al. nor Takahashi et al. discloses an ion planter comprising an arc chamber and a first power supply, nor the ion implanter comprising a second and third power supply. Ito et al. discloses an arc chamber and a first power supply (**46**) (Col. 5, Lines 23-30). Ito also discloses a second power supply (**15**) and a third power supply (**32**) (Col. 5, Lines 31-32). It would have been obvious to one having ordinary skill in the art at the time the invention

was made to include the arc chamber and first power supply for biasing the arc chamber because this would result in the ion beam being shielded from the voltage within the chamber. It would have also been obvious to include a second and third power supply because these power supplies would bias the components of the analyzer and beam filter, respectively.

Claims 2, 6, 16, 31, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over are Ogata et al. in view of Takahashi et al. in further view of Ito et al. in further view of Harrison et al. (5,747,936).

Harrison discloses the target site being grounded (Col. 6, Lines 55-58). When holding the target site at ground, the final energy is equal to the charge of the ions times the first voltage, therefore it would have been obvious to include the teachings of Harrison and keep the target site at ground potential.

Claims 7, 8, 12, 21, 22, 26, 35, 43, 50, 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. in view of Takahashi et al. in further view of Enge (4,276,477).

Although Ogata et al. discloses an ion source for producing an ion beam, Ogata does not disclose the shape of the beam. Enge discloses the ion beam being ribbon-shaped and uniform across its width (Col. 6, Lines 12-33). This results in the beam being focused in a vertical plane onto the target. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the ion source of Ogata et al. and Takahashi et al. with the teachings of Enge because this would result in the ions being implanted into the target uniformly, improving beam transmission.

Claims 9, 23, 36, 44, 51, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. in view of Takahashi et al. in further view of Ono et al. (5,343,047).

Ogata et al. does not disclose an electron generator for supplying electrons to the ion beam. Ono et al. discloses an electron generator in Fig. 5 for adding electrons to the ion beam (Col. 3, Lines 44-45). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the ion source of Ogata with the electron generator taught by Ono because supplying electrons to the electron beam limits beam expansion.

Response to Arguments

Applicant's arguments with respect to claims 1-57 have been considered but are moot in view of the new ground(s) of rejection. Furthermore, this rejection of the claims overcomes the limitations of the claims wherein a deceleration stage decelerates the ion beam to a final energy less than the first transport energy thus resulting in limited beam expansion and a low energy ion beam being implanted into the target.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary A. El-Shammaa whose telephone number is 703.308.0851. The examiner can normally be reached on M-F (8:30am-5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on 703.308.4116. The fax phone numbers for the organization where this application or proceeding is assigned are 703.872.9318 for regular communications and 703.872.9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.872.9317.

MAE
July 21, 2003

JOHN R. LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800